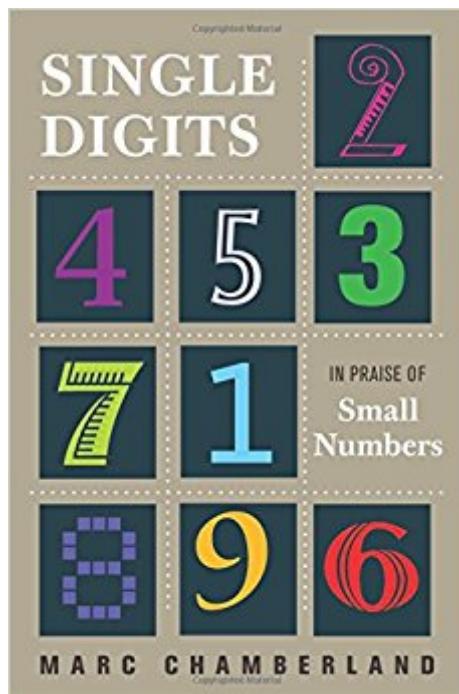


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# Single Digits: In Praise Of Small Numbers



## Synopsis

In Single Digits, Marc Chamberland takes readers on a fascinating exploration of small numbers, from one to nine, looking at their history, applications, and connections to various areas of mathematics, including number theory, geometry, chaos theory, numerical analysis, and mathematical physics. For instance, why do eight perfect card shuffles leave a standard deck of cards unchanged? And, are there really "six degrees of separation" between all pairs of people? Chamberland explores these questions and covers vast numerical territory, such as illustrating the ways that the number three connects to chaos theory, the number of guards needed to protect an art gallery, problematic election results and so much more. The book's short sections can be read independently and digested in bite-sized chunks—especially good for learning about the Ham Sandwich Theorem and the Pizza Theorem. Appealing to high school and college students, professional mathematicians, and those mesmerized by patterns, this book shows that single digits offer a plethora of possibilities that readers can count on.

## Book Information

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## Customer Reviews

"Fascinating. . . . Chamberland offers enticing explanations that will leave readers hungry to know more. This wonderful book never loses its focus or momentum."--Publishers Weekly "[B]oth amateur and professional mathematicians alike will find new items of interest here. . . . [A] welcome, splendid, fruitful addition to my math bookshelf."--Math Tango blog "The collection is outright delightful. It will agitate the minds of students and shake the sense of know-all off many a

professional and most of the amateurs."--Alexander Bogomolny, Cut the Knot blog "Boring deep into the innocuous-looking number one, Chamberland opens an unexpected entry point into a dizzying maze of infinities. . . . A bracing mathematical adventure."--Booklist "The exotics like pi and e have gotten their share of attention in the world of popular mathematical writing. Now it's time to give proper attention to the integers 1 through 9. . . . [Single Digits] is consistently entertaining and well-written."--MAA Reviews "Chamberland takes readers on a fascinating exploration of small numbers, from one to nine, looking at their history, applications, and connections to various areas of mathematics, including number theory, geometry, chaos theory, numerical analysis, and mathematical physics. . . . Appealing to high-school and college students, professional mathematicians, and those mesmerized by patterns, this book shows that single digits offer a plethora of possibilities that readers can count on."--DVD, Lunar and Planetary Information Bulletin "Chamberland makes this an entertaining and historical exposition, using wit and humor throughout."--Math Horizons "To put it simply, this book is a delight. Chamberland has assembled a fascinating collection of vignettes, each tied to a digit from one to nine, that inform, entertain, and intrigue. . . . This wide spectrum of ideas is consistently interesting, and the author's skill in mining each nugget is worthy of great respect."--Choice "The range of topics included virtually guarantees that any reader will find new and unfamiliar material to enjoy. . . . [Single Digits] is a very enjoyable book which, at many points, makes some very deep mathematics quite accessible. Highly recommended."--Keith Johnson, CMS Notes "For instructors of math courses of all levels, the vignettes in Single Digits can provide a very readable introduction or jumping-off point for discussions and projects. . . . In an introductory group theory course, it would be a good exercise for students to consider perfect riffle shuffles in decks of size other than 52. Finally, a statistics class collecting and analyzing real-world data sets could consider whether Benford's Law applies in their situation."--Matthew Welz, MAA Focus "I highly recommend Single Digits: In Praise of Small Numbers. It would be a fine addition to any high school or math department library. As a carefully curated set of interesting topics, it would serve as a good place to start exploring the ocean of ideas in mathematics."--Bruce Cohen, NCTM

"A veritable potpourri of mathematical factoids, Single Digits will provide you with conversational ammunition for all manner of nerdy gatherings."--Henry Reich, creator of MinutePhysics and MinuteEarth "Dispensing incisive, brief expositions of mathematical observations, facts, theorems, proofs, conjectures, and open problems, this cornucopia of a book ranges through geometry, number theory, combinatorics, topology, and many other areas. From the elegantly elementary to

the sublimely difficult, each of its short sections is liable to stimulate an eager search for further enlightenment, whether from the internet, the library, or your own mind."--Avner Ash, coauthor of *Elliptic Tales*"A survey of mathematical gems, ancient and modern, this book is certain to arouse the curiosity of anyone with even a passing interest in mathematics. Chamberland's clear explanations provide an enticing introduction to each topic and will make you want to learn more."--Jamie Pommersheim, coauthor of *Number Theory*"This book describes properties associated with the numbers one to nine and connects important areas of mathematics, including number theory, geometry, chaos theory, and applied mathematics. *Single Digits* is filled with nuggets of mathematical information, compelling topics, and interesting ideas for anyone curious about the subject."--Lee Fothergill, Mount Saint Mary College"A celebration of small numbers, *Single Digits* presents mathematical vignettes organized by their connection to single nonzero digits. Progressing from the elementary to the more elaborate, Chamberland brings together some really interesting mathematics, and his well-told stories will intrigue a general, knowledgeable audience."--Jennifer Quinn, University of Washington, Tacoma

Grab a pencil and paper -- you'll need to take notes, but you'll enjoy working through many of the examples. Don't worry -- hardly any calculus. An absolute joy.

A fun and interesting take on numbers.

Very enjoyable. Lots of things that were new to me. A pleasant, easy high-school math book.

Are you a mathematician? If you are, then this book is for you. Author Marc Chamberland, has written outstanding book that is about single digits, specifically, the numbers 1 to 9. The author begins by discussing that in a mathematical world with so many apparent options, having exactly one possibility is a valued commodity. Next, he explains how the number 2 makes beautiful appearances in formulas related to powers and prime numbers. Then, the author discusses why with the number 3, you plunge into a world of bouncing numbers, chaotic dynamics, and voting paradoxes. Also, he states that the number 4 offers a perfect balance: whether it's the number of players in a bridge game, double dates, the legs of a table, four colors, four travelers, or four corners. The author continues by focusing on how the number 5 embraces order as the number of Platonic solids, and is baked into the Rogers-Ramanujan identities, yet it shakes a fist at closed-form solutions to quintic equations or fitting nicely into tessellations. Then, he discusses why

the number 6 is technically a perfect number, because all of its factors less than itself—1, 2, and 3—sum to itself. Then, the author discusses how the number 7 is special for multiplication, hearing the shape of a drum, and signal synchronization. In addition, he explains how the number 8 will grip you with the perfect card shuffling and the beautiful Sierpinski Carpet. Finally, the author looks at how the number 9 connects back to prime numbers, packings, and powers of numbers; as well as, the Heegner numbers with their surprising connections. Each single number (except the number 0) in this excellent book has fascinating properties connected to the many different areas of mathematics, including number theory, geometry, chaos, numerical analysis, mathematical physics, and much more. Some of the topics covered in this great book, such as the Pizza Theorem, require little mathematical background and are understandable by a curious 12-year-old; other sections require modest amounts of technical math, while a few sections, such as the section on E8, allude to such sufficiently advanced material that it should not be read with small children present.

Regular consumers of 'popular' math books will encounter a few chestnuts they've seen many times before (e.g., Erdos number), but there are enough mathematical curiosities in this book to justify taking a look. I picked up this book in the New Books section of my local library, and am planning to buy it. I only noticed one error: in Figure 3.1, the arrow should loop back to the "4" rather than the "2".

This book is a great idea but what appears here is a first draft. The book needs more meat to make it understandable. A visual proof of the Pythagorean Theorem is "presented" in Figure 2.4 but the explanation does not match the figure -- and figure and explanation are on the opposite sides of the same page, which you keep turning and turning, trying to figure things out. Here's a quote from The Twin Prime Conjecture: "...PrimeGrid announced the largest known twin primes: 3,756,801,695 x 2,666,669 +/-1. These numbers have 200,700 decimal digits." That is simply senseless. Like so many places in this book, you read, you stop, you scratch your head, and you ask yourself, "What the heck does that really mean?" This book does not tell you.

Cool book. Full of fascinating tidbits from all branches of mathematics. Nine chapters on the numbers 1-9 naturally. No pun intended. Chapter 1 has 13 topics treated briefly, each illustrating the number one. His choices are interesting. Chapter one has a section on the Cantor middle third set. So what does this have to do with the number one? After an infinite number of increasingly smaller

middle third intervals of a segment of length one are removed, the total length of all of the removed pieces is one, yet an uncountable set of numbers not removed (Cantor dust) remains on the interval. Lots of stuff I never saw before. A treasure trove for math teachers and mathophiles everywhere. Loved it.

Excellent book. As I read it the ideas got bigger and my mind got smaller. As it always should be.

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